

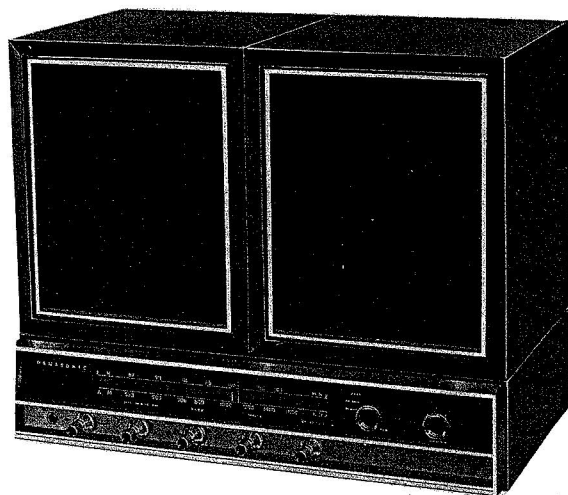


ORDER NO. RD-654

**NATIONAL PANASONIC**

Service Manual

MODEL RE-7670B

Original**FM-AM FM STEREO TABLE RADIO****MODEL RE-7670B**

SPECIFICATIONS

Frequency Range:	FM 87.5~108 MHz AM 520~1610 kHz (577~186 m)	Diodes:	0A90/1N34A×2 FM D. AGC 0A90/1N34A AM Detector & AGC 0A90/1N34A×2 FM Detector 0A90/1N34A×4 MPX Detector 1S1211×2 Operation Compensator 0A90/1N34A DC Switching
Intermediate Frequency:	FM 10.7 MHz AM 455 kHz	Sensitivity:	FM 10μV for 30dB Quieting AM 70μV/m for 50mW Output
Transistors:	2SK19 FM RF Amplifier 2SC469 FM Oscillator 2SC920 FM Mixer 2SC920 AM Converter 2SC469 FM 1st IF Amplifier 2SC469 FM 2nd IF Amp. & AM 1st IF Amp. 2SC469 FM 3rd IF Amp. & AM 2nd IF Amp. 2SC183 Composite Signal Amplifier 2SC183 19 kHz Amplifier 2SA101 38 kHz Amplifier 2SC183 DC Amplifier 2SB178 Eye Switching 2SA564×2 Pre Amplifier 2SB173×2 Squelch & 1st AF Amplifier 2SB173×2 2nd AF Amplifier 2SB176×2 3rd AF Amplifier 2SB473×4 Power Amplifier (push-pull) 2SB178 Regulator 2SC183 Regulator	Peak Music Power:	12W
		Power Source:	AC 100/120/220/240 V 50-60 Hz
		Power Consumption:	25W
		Speakers:	Two 16cm (6½") PM Dynamic Speaker, Imp. 16Ω
		Cabinet Dimensions:	Tuner 421(Wide)×97.5(High)×230(Deep)mm (16⅞"×3⅞"×9⅞") Speaker System 210(Wide)×254(High)×215(Deep)mm (8¼"×10"×8½")
		Weight:	Tuner 4.36 kg. (9 lb. 10 oz.) Speaker System 3.9 kg. (8 lb. 10 oz.)
Diodes:	1S351 FM AFC 1S1211 FM D. AGC 1S1211 FM AGC	Impedance:	FM Antenna Terminal 300Ω Unbalance Phono Jack 2MΩ Tape Jack 20KΩ Rec. Out Jack 2KΩ Speaker Jack 16Ω Headphone Jack 8~16Ω

<EXPORT DIVISION>

MATSUSHITA ELECTRIC TRADING CO., LTD.
P. O. Box 288, Central Osaka, Japan**MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.**
RADIO and STEREO DIVISION

To Remove Chassis (Refer to Figs. 1-A & B)

1. Remove seven (7) control knobs from cabinet front.
2. Remove three (3) rear panel mounting screws, nos. 2~4, as illustrated in fig. 1-A.
3. Remove rear panel.
4. Remove four (4) red cabinet-mounting screws, nos. 1, 5, 6 & 11, as illustrated in fig. 1-A.
5. Remove four (4) red chassis-mounting screws, nos. 7~10, as illustrated in fig. 1-A.
6. Remove three (3) red chassis-mounting screws, nos. 1~3, as illustrated in fig. 1-B.
7. To remove chassis completely, remove three (3) headphone jack mounting screws.
8. To reassemble, reverse the above procedure.

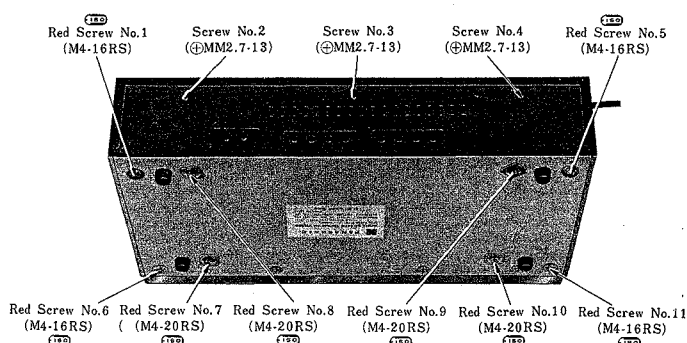


Fig. 1-A

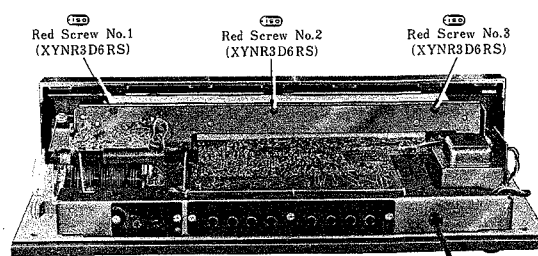
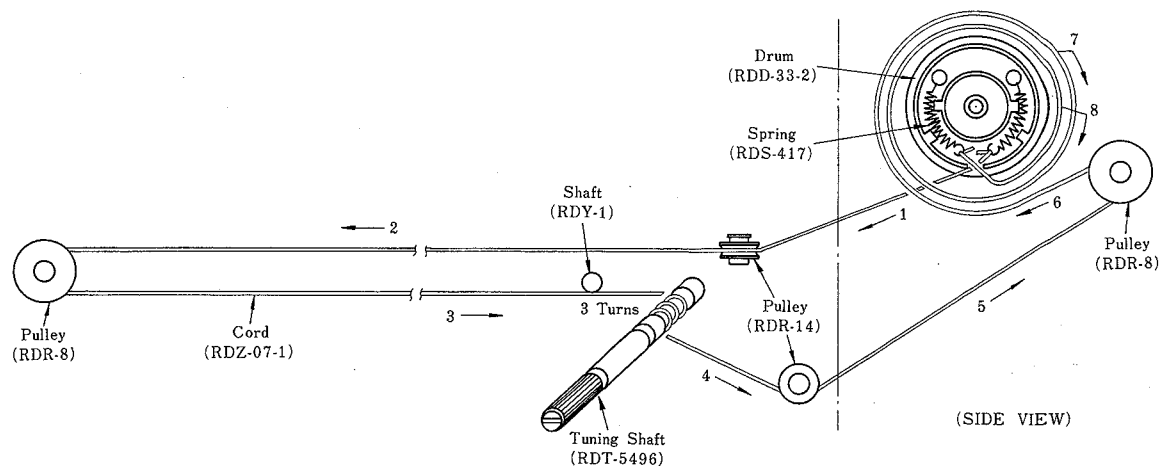


Fig. 1-B

Fig. 1 Top View—Disassembly Points



Notes :

1. Dial cord length is 140cm (55 $\frac{1}{8}$ ").
2. Tuning gang is positioned at maximum capacity.
3. Arrow marks (1~8) indicate correct order and direction of stringing dial cord.
4. Cement dial cord ends.

To Mount Dial Pointer

1. Set tuning gang to fully closed position.
2. Set dial pointer to start point of dial scale.
3. Attach dial cord to dial pointer.

Fig. 2 Dial Cord Stringing Guide

MODEL RE-7670B

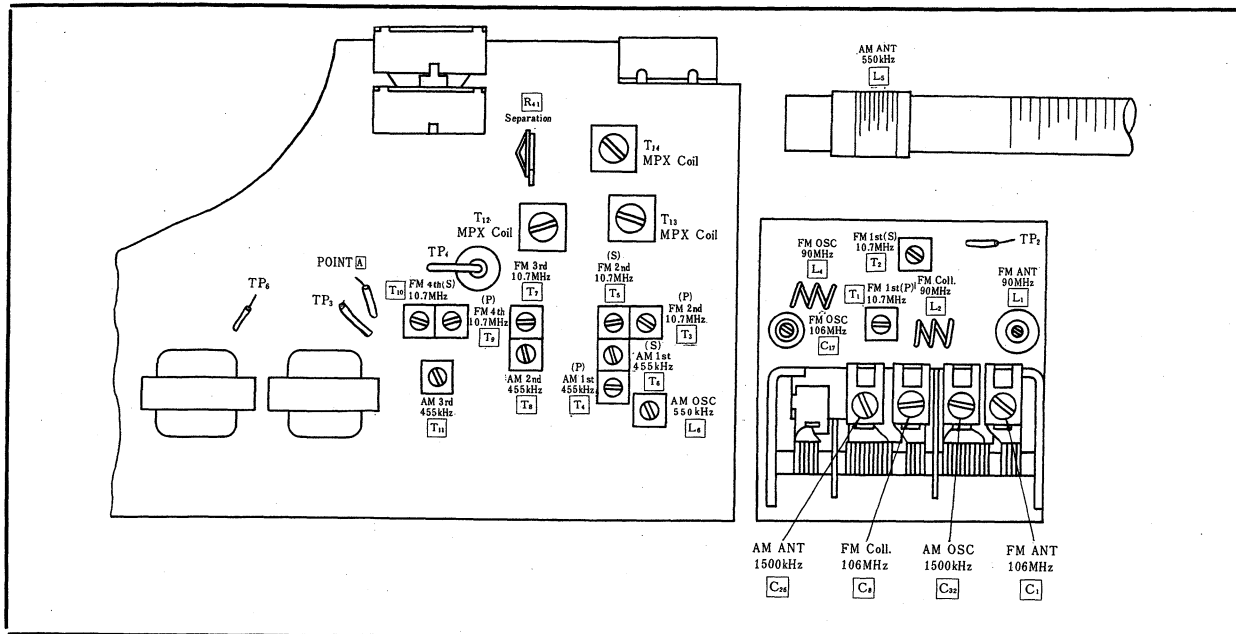


Fig. 3 Alignment Points

ALIGNMENT INSTRUCTIONS

FREQUENCY & DISTANCE ON DIAL SCALE

To accurately align the proper frequencies to the dial scale, refer to Table and mark the edge of the dial scale plate accordingly using the "Start Point" mark on the dial scale as a reference point.

Notes:

1. Remove line cord antenna from FM external antenna terminal when aligning.
2. Make certain that speaker system is connected to the tuner when aligning.

I. AM/FM IF & RF ALIGNMENT

AM IF & RF ALIGNMENT

Output of signal generator should be no higher than necessary to obtain an output reading.
Set band selector switch to AM.
Set volume control to maximum.
Set balance control to center.
Set bass control to center.
Set treble control to center.
Set power source voltage to 100 volts AC.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUSTMENT	REMARKS
1	Fashion loop of several turns of wire and radiate signal into loop of receiver.	455 kHz (400~ Mod.)	Point of non-interference. (on/about 600 kHz)	Output meter across EXT speaker jack (L).	T4 (1st IFT) (P) T6 (1st IFT) (S) T8 (2nd IFT) T11 (3rd IFT)	Adjust for maximum output.
2	"	550 kHz (400~ Mod.)	550 kHz	"	L6 (OSC Coil) L5 (ANT Coil)	Adjust for maximum output by sliding coil (L5) along ferrite core.
3	"	1500 kHz (400~ Mod.)	1500 kHz	"	C32 (OSC Trimmer) C26 (ANT Trimmer)	Adjust for maximum output. Repeat steps (2) and (3).

Note: Cement antenna bobbin with wax after completing alignment.

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FM IF & DETECTOR ALIGNMENT WITH OSCILLOSCOPE

EQUIPMENT REQUIRED

Signal generator that provides 10.7 MHz marker.
Sweep generator that provides 10.7 MHz center frequency and 400 kHz sweep width.

OSCILLOSCOPE

Set sweep selector of oscilloscope to "External Sweep". Apply 60 Hz sweep signal from sweep generator to horizontal input terminals of oscilloscope.
Set band selector switch to FM AUTO.
Set volume control to minimum.
Set balance control to center.
Set bass control to center.
Set treble control to center.
Set AFC switch to OFF.
Set power source voltage to 100 volts AC.

Note: When marking alignment step 1, unsolder lead between test point TP3 and point A before alignment and resolder it after alignment.

	SWEEP GENERATOR COUPLING	SIGNAL GENERATOR COUPLING	RADIO DIAL SETTING	INDICATOR	ADJUSTMENT	REMARKS
1	High side thru. .001mfd to point TP2. Common to chassis.	High side thru. .001mfd to point TP2. Common to chassis.	Point of non-interference. (on/about 90 MHz).	Connect vert. Amp. of scope to point TP3. Common to chassis.	T1 (FM 1st IFT) (P) T2 (FM 1st IFT) (S) T3 (FM 2nd IFT) (P) T5 (FM 2nd IFT) (S) T7 (FM 3rd IFT) T9 (FM 4th IFT) (P)	Adjust for maximum amplitude and proper linearity between ± 100 kHz markers. (Refer to fig. 4)
2	"	"	"	Connect vert. Amp. of scope to point TP4. Common to chassis.	T10 (FM 4th IFT) (S)	Adjust T10 so that 10.7 MHz marker is at the center. (Refer to fig. 5)

Note: When aligning the Ratio Detector stage, the wave form may appear as in figs. 4 & 5 or upside-down.

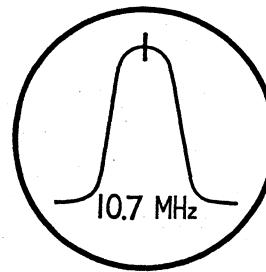


Fig. 4

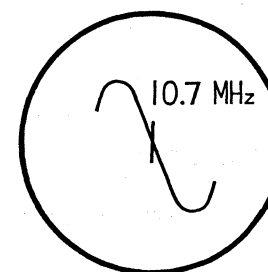


Fig. 5

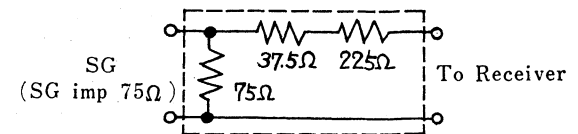


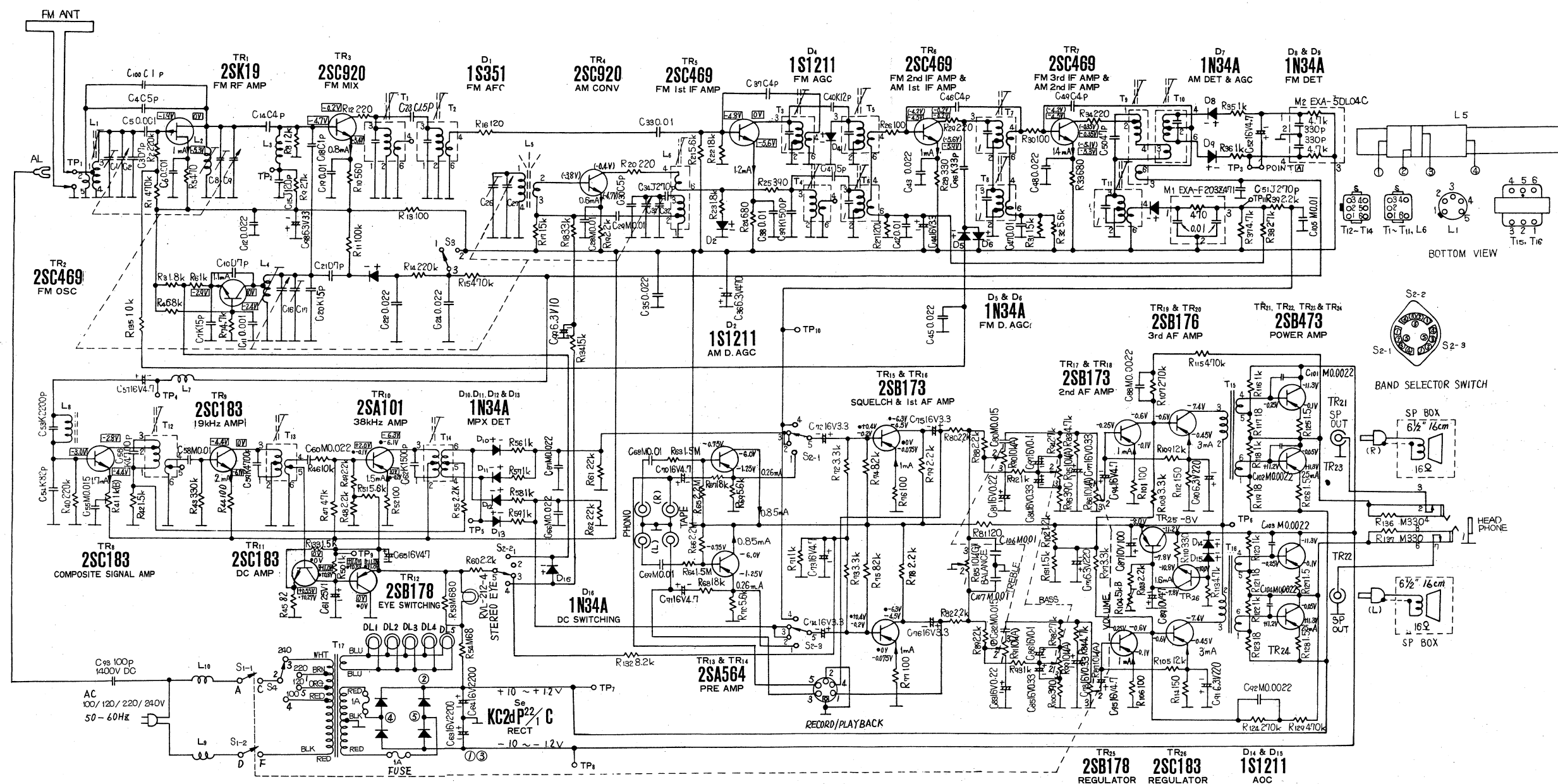
Fig. 6 FM Dummy Antenna

FM RF ALIGNMENT

Output of signal generator should be no higher than necessary to obtain an output reading.
Set volume control to maximum.
Set band selector switch to FM AUTO.
Set power source voltage to 100 volts AC.
Set balance control to center.
Set AFC switch to OFF.
Set bass control to center.
Set treble control to center.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUSTMENT	REMARKS
3	Connect to EXT. FM Antenna terminal through FM Dummy antenna. (Refer to fig. 6)	90 MHz (400~ Mod.)	90 MHz	Output meter across EXT. speaker jack (L).	L4 (FM OSC Coil) L1 (FM ANT Coil) L2 (FM Collector Coil)	Adjust for maximum output.
4	"	106 MHz (400~ Mod.)	106 MHz	"	C17 (FM OSC Trimmer) C1 (FM ANT Trimmer) C8 (FM Collector Trimmer)	Adjust for maximum output. Repeat steps (3) and (4).

Note: Three output responses will be present; proper tuning is the center frequency.



Notes:

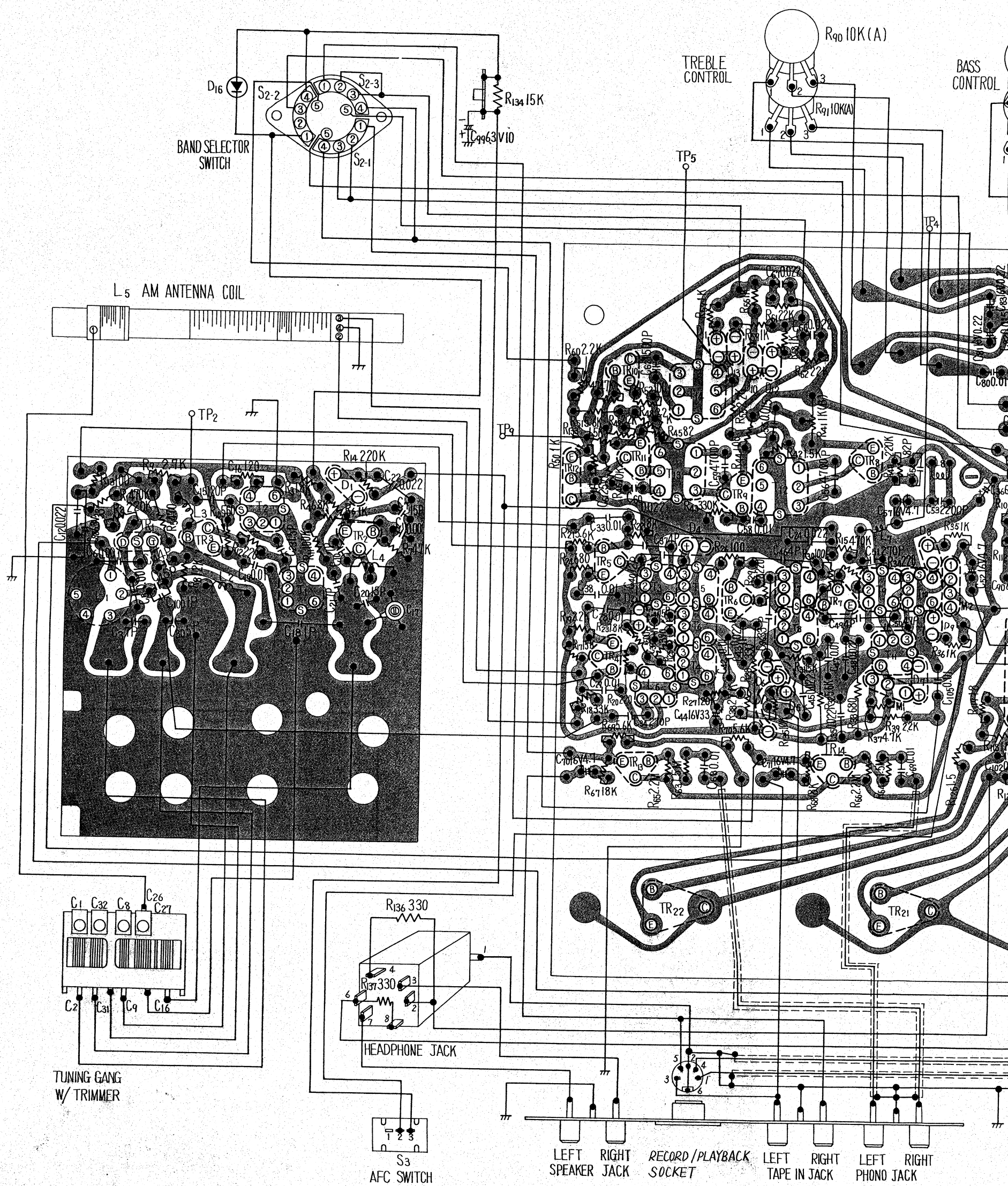
1. S1-1~S1-2: Power source switch in "OFF" position.
2. S2-1~S2-3: Band selector switch in "FM STEREO" position.
3. S3: FM AFC switch in "ON" position.
4. S4: Power source voltage selector switch in "240V" position.
5. DC Voltage measurements are taken with circuit tester (10K Ω /V) from chassis.
☐FM position ☐AM position
 •FM stereo position
6. Capital letters (J, K, M, C, D) in the circuit diagram show

allowable tolerance of resistors and capacitors as follows:

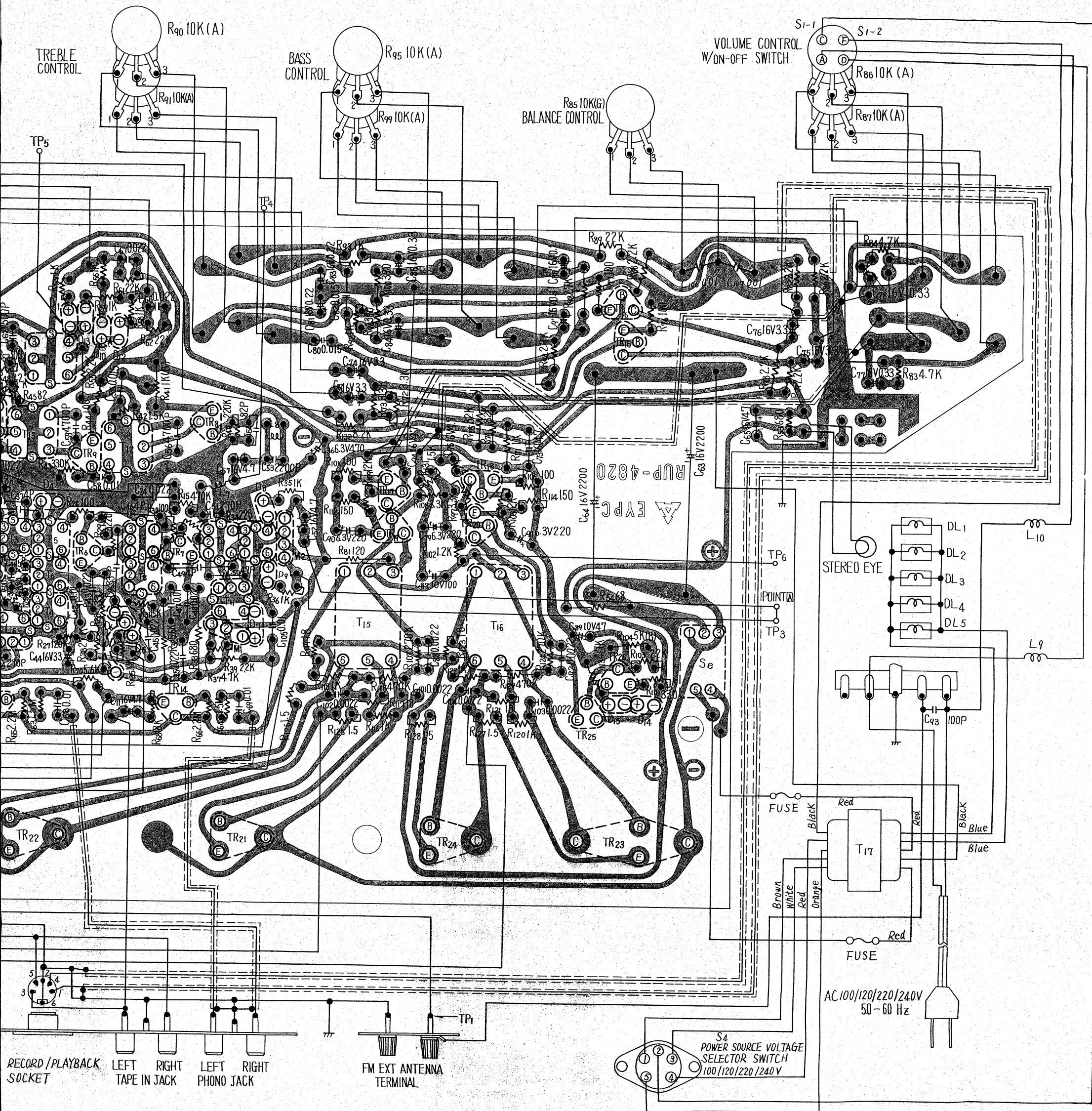
- J = $\pm 5\%$ K = $\pm 10\%$ M = $\pm 20\%$ C = $\pm 0.25\text{PF}$ D = $\pm 0.5\text{PF}$
 • Tolerance of resistor is $\pm 10\%$ (K) if not otherwise indicated.
 • Tolerance of capacitor is $+100\%$ (P) if not otherwise indicated.
 - 0%
 7. PF=pico farad=mmf
 μF =micro farad=mmf
 8. All resistor values in ohms (K=1000 Ω).
 9. All capacitor values in micro farads (P=mmf).

Fig. 7 Schematic Diagram

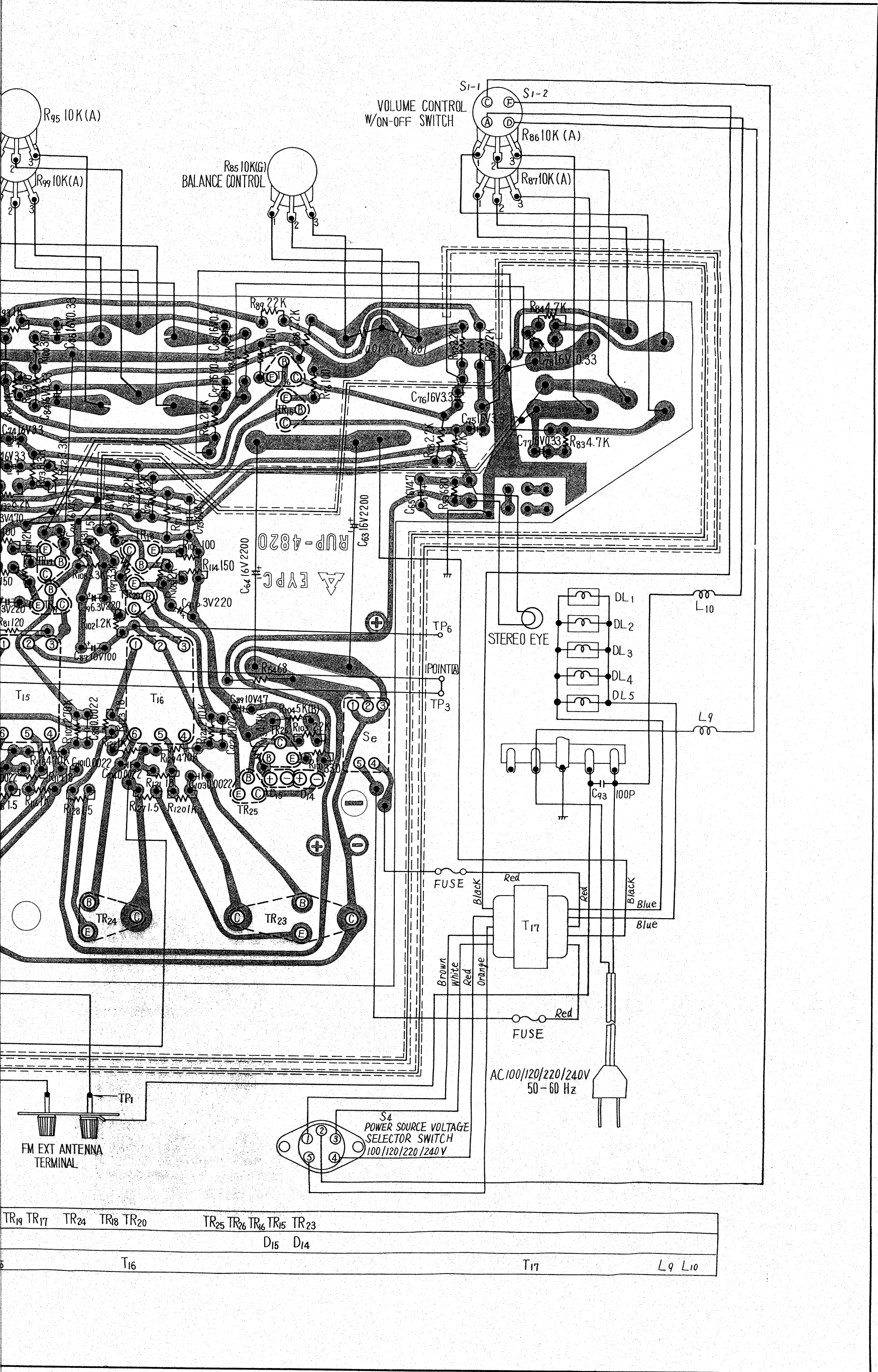
Fig. 8 Circuit Board Wiring View (Conductor Side)



TR	TR ₁	TR ₃	TR ₂		TR ₁₂	TR ₄	TR ₅	TR ₁₀	TR ₁₃	TR ₁₁	TR ₂₂	TR ₆	TR ₉	TR ₁₄	TR ₇	TR ₈	TR ₂₁						
D	D ₁₆				D ₁	D ₂				D ₄	D ₁₁	D ₃	D ₁₀	D ₁₂	D ₆	D ₅	D ₇	D ₈	D ₉				
T&L	L ₁	L ₃	L ₂	L ₅	T ₂	T ₁	L ₄	L ₆	T ₃	T ₁₃	T ₁₄	T ₅	T ₆	T ₄	T ₁₂	T ₇	T ₈	L ₇	T ₉	T ₁₀	T ₁₁	L ₈	T ₁



TR11	TR22	TR6	TR9	TR14	TR7	TR8	TR21	TR19	TR17	TR24	TR8	TR20	TR25	TR26	TR6	TR15	TR23
D4	D11	D3	D10	D12	D6	D5	D7	D8	D9				D15	D14			
T4	T5	T6	T4	T12	T7	T8	L7	T9	T10	T11	L8	T15	T16		T17	L9	L10



MODEL RE-76708

19 kHz AMP. ALIGNMENT

* Stereo Modulator.....Connect Stereo Modulator output to EXT. Mod. terminal of signal generator

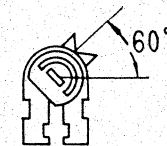
* Signal GeneratorModulation Rate of 19 kHz Pilot Signal.....10%

 Output Level.....30 dB

 FrequencyApproximately 89.5 MHz.

* Oscilloscope * Dummy Antenna

Tuner.....Band selector switch to "FM STEREO", Bass control to "center"
Treble control to center, AFC switch to "OFF", Balance control to
"center", Volume control to audible level of speaker sound, Dial
setting to approximately 89.5 MHz.



$R_{41} \ 1K\Omega$
Separation Control

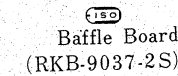
1. When aligning, remove line cord antenna attached to External FM Antenna terminal.
2. When aligning, set separation control (R₄₁ 1K Ω) as illustrated in fig. 9.
3. When aligning, short test point **TP₉** to ground and open the shorted **TP₉** after completing alignment.

1

EQUIPMENT REQUIRED

- EQUIPMENT REQUIRED**
- * Stereo Modulator.....Connect Stereo Modulator output to EXT. Mod. terminal of signal generator.
 - * Signal GeneratorModulation Rate by 19 kHz Pilot Signal.....10%
Modulation Rate by L+R Signal27%
Output Level60dB
 - * Oscilloscope * VTVM * Dummy Antenna * Low Pass Filter

Tuner.....Band selector switch to "FM STEREO", Bass control to "center", Treble control to "center", AFC switch to "OFF", Volume control to audible level of speaker sound, Dial setting to approximately 89.5 MHz. Adjust balance control so that output level from both units becomes equal.

23

Scale
(RKD-6280)

Badge
(RGB-420)

Panel
(RGP-3040)

Headphone Ja
(RJJ-79)

Knob
(RBN-280)

Indicating Plate
(RGK-567)

Badge
(RGB-33)

Cabinet (complete)
RYA-4750S

Pointer
(RDP-329)

Escutcheon
(RGC-1210 S)

Knob
(RBN-281)

Fig. 10 Cabinet & Appearance—Parts Identification



Fig. 11 Component View—Parts Identification, IF, MPX & Audio Circuit

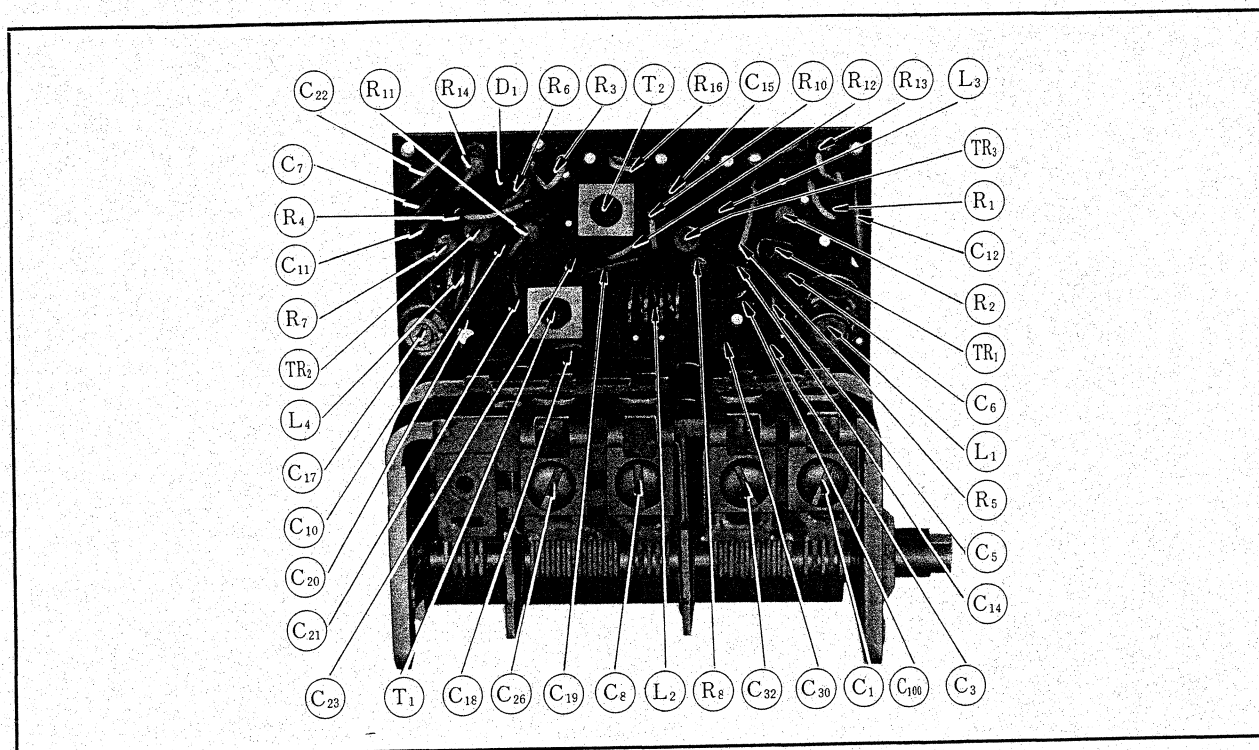


Fig. 12 Component View—Parts Identification, FM RF Circuit

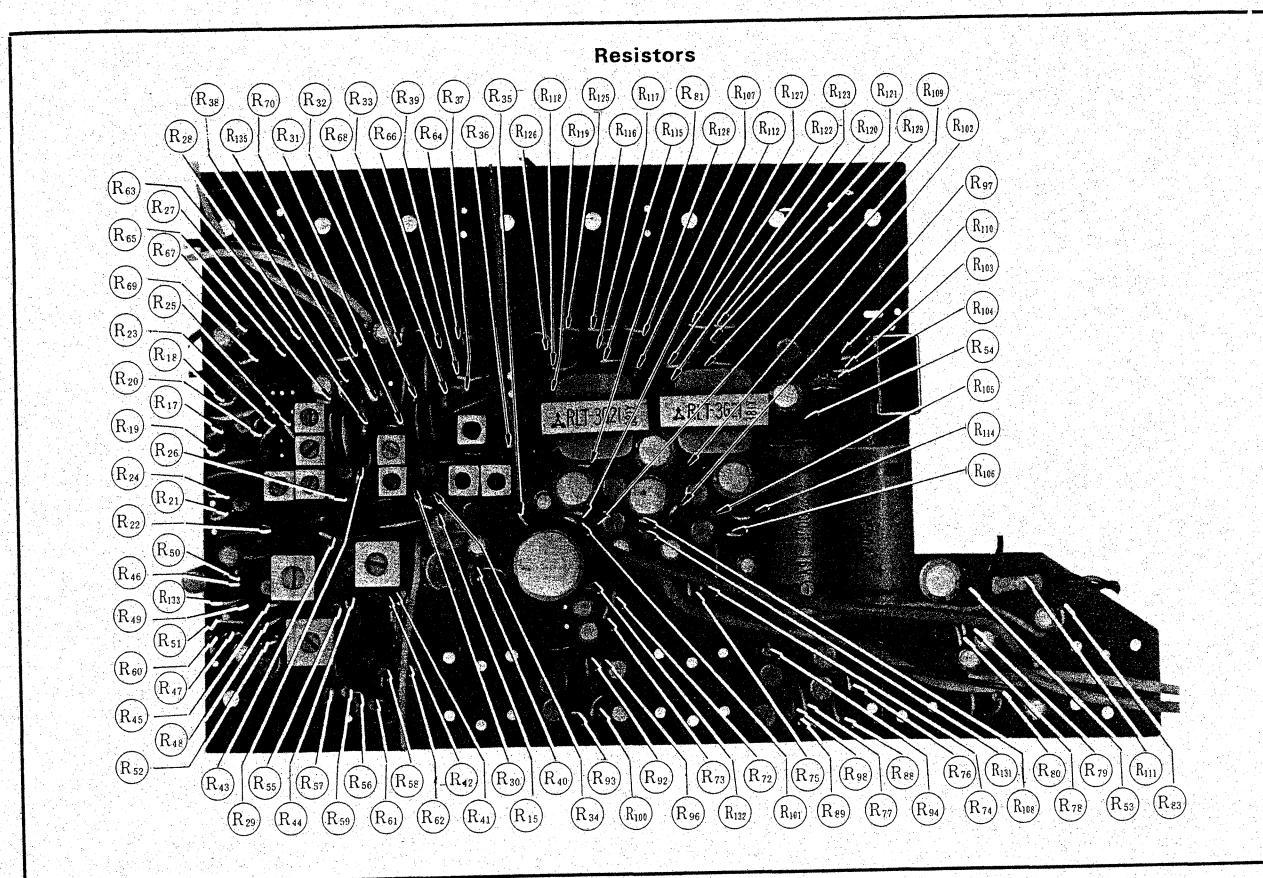


Fig. 13 Component View—Parts Identification, IF, MPX & Audio Circuit

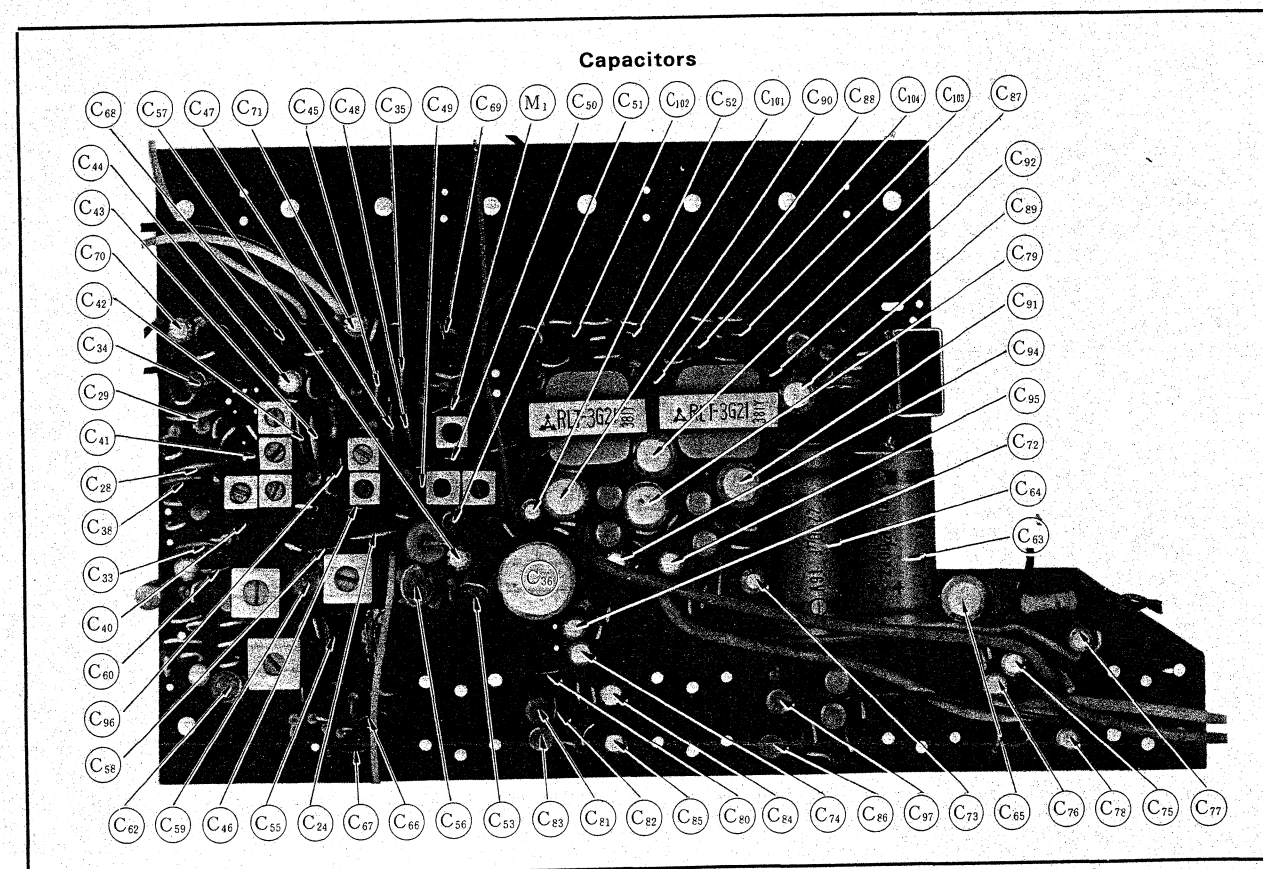
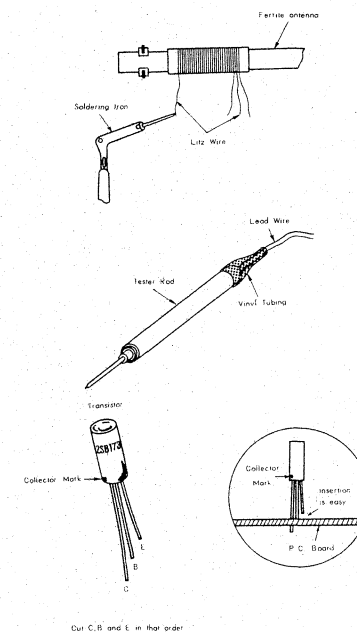


Fig. 14 Component View—Parts Identification, IF, MPX & Audio Circuit

SERVICE AIDS

HOW TO SOLDER THE LITZ WIRE OF FERRITE ANTENNAS

When soldering Litz wire of the old type, it is difficult to remove the material covering the soldered part. When soldering the Litz wire of the new type, however, it is easy to remove the covering material with a soldering iron as shown in the illustration.

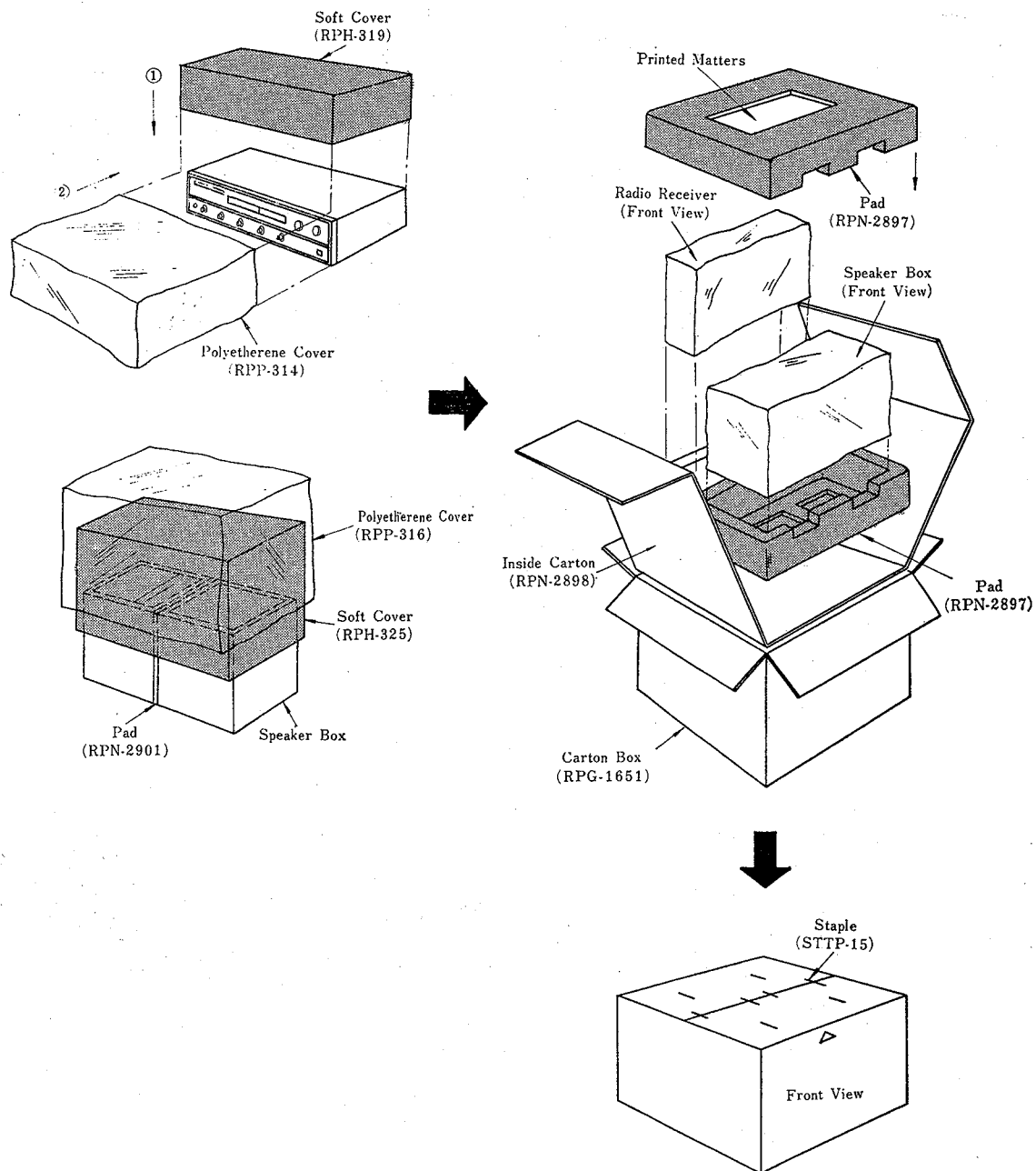


TRANSISTOR REPLACEMENT

When replacing a bad transistor, you may accidentally solder a lead (leg) in the wrong position and the solder cannot be removed. The best method to make transistor replacement without making this error is to cut the transistor lead wires diagonally (in the order C, B and E) as shown in the illustration, in order that leg insertion can be easily performed. If a mistake is made, it can be easily and quickly detected and corrected.

HOW TO AVOID BREAKING TESTER ROD LEAD WIRE

The test lead wire may break at its connection with the tester rod. To avoid this, put a piece of vinyl tubing onto the end of the tester rod as shown in the illustration. This will make much longer life without breaking.



PARTS LIST—PACKING	
Part No.	Description
RPH-319	Soft Cover
RPH-325	Soft Cover
RPP-314	Polyetherene Cover
RPP-316	Polyetherene Cover
RPN-2901	Pad
RPN-2897	Pad (2 req'd)
RPN-2898	Inside Carton
RPG-1651	Carton Box
RQX-5004A	Instruction Book

Fig. 16 Component Packing



REPLACEMENT PARTS LIST

- Notes:** 1. * indicates parts for the complete cabinet which are included when the cabinet is ordered.
 2. Part numbers are indicated on most mechanical parts. Please use this number, therefore, when ordering parts.
 3. ISO metric thread screws & parts which employ ISO metric thread screws are identified by ISO marking.

Ref. No.	Part No.	Description
TRANSISTORS AND DIODES		
TR ₁	2SK19	FM RF Amplifier
TR ₂	2SC469	FM Oscillator
TR ₃	2SC920	FM Mixer
TR ₄	2SC920	AM Converter
TR ₅	2SC469	FM 1st IF Amplifier
TR ₆	2SC469	FM 2nd IF Amp. & AM 1st IF Amp.
TR ₇	2SC469	FM 3rd IF Amp. & AM 2nd IF Amp.
TR ₈	2SC183	Composite Amplifier
TR ₉	2SC183	19 kHz Amplifier
TR ₁₀	2SA101	38 kHz Amplifier
TR ₁₁	2SC183	DC Amplifier
TR ₁₂	2SB178	Eye Switching
TR ₁₃	2SA564	Pre Amplifier (Right)
TR ₁₄	2SA564	Pre Amplifier (Left)
TR ₁₅	2SB173	Squelch & 1st AF Amplifier (Right)
TR ₁₆	2SB173	Squelch & 1st AF Amplifier (Left)
TR ₁₇	2SB173	2nd AF Amplifier (Right)
TR ₁₈	2SB173	2nd AF Amplifier (Left)
TR ₁₉	2SB176	3rd AF Amplifier (Right)
TR ₂₀	2SB176	3rd AF Amplifier (Left)
TR ₂₁	2SB473	Power Amplifier (Right)
TR ₂₂	2SB473	
TR ₂₃	2SB473	
TR ₂₄	2SB473	
TR ₂₅	2SB178	Regulator
TR ₂₆	2SC183	Regulator
D ₁	1S351	FM AFC
D ₂	1S1211	AM D. AGC
D ₄	1S1211	FM AGC
D ₅	OA90 or 1N34A	FM D. AGC
D ₆	OA90 or 1N34A	
D ₇	OA90 or 1N34A	AM Detector & AGC
D ₈	OA90 or 1N34A	FM Detector
D ₉	OA90 or 1N34A	
D ₁₀	OA90 or 1N34A	MPX Detector
D ₁₁	OA90 or 1N34A	
D ₁₂	OA90 or 1N34A	
D ₁₃	OA90 or 1N34A	
D ₁₄	1S1211	Operation Compensator
D ₁₅	1S1211	
D ₁₆	OA90 or 1N34A	DC Switching
RECTIFIER		
Se	KC2dP22/1C	Rectifier
CAPACITORS		
C ₂ , C ₉ , C ₁₆ , C ₂₇ , C ₃₁	ECV-5XR27B13S	Tuning Gang, w/Trimmer (C ₁ , C ₈ , C ₂₆ , C ₃₂)
C ₃	ECC-D05070DC	7 PF, 50WV, ±0.5 PF, Ceramic
C ₄	ECC-D05050CC	5 PF, 50WV, ±0.25 PF, Ceramic
C ₅	ECK-D05102P	0.001 μF, 50WV, +100%, -0%, Ceramic
C ₆	ECK-D05102P	0.001 μF, 50WV, +100%, -0%, Ceramic
C ₇	ECC-D05150KC	15 PF, 50WV, ±10%, Ceramic
C ₁₀	ECC-D05070DC	7 PF, 50WV, ±0.5 PF, Ceramic
C ₁₁	ECK-D05102P	0.001 μF, 50WV, +100%, -0%, Ceramic
C ₁₂	ECK-E05223P	0.022 μF, 50WV, +100%, -0%, Ceramic
C ₁₄	ECC-D05040C	4 PF, 50WV, ±0.25 PF, Ceramic
C ₁₅	ECM-S05121J-H	120 PF, 50WV, ±5%, Mica

Ref. No.	Part No.	Description
CAPACITORS		
C17	ECV-1ZW10P12	Trimmer, FM Oscillator
C18	ECC-D05010C	1 PF, 50WV, ± 0.25 PF, Ceramic
C19	ECK-E05103P	0.01 μ F, 50WV, +100%, Ceramic - 0%,
C20	ECC-D05150KC	15PF, 50WV, $\pm 10\%$, Ceramic
C21	ECC-D05070DC	7 PF, 50WV, ± 0.5 PF, Ceramic
C22	ECK-E05223P	0.022 μ F, 50WV, +100%, Ceramic - 0%,
C23	ECC-D051R5C	1.5 PF, 50WV, ± 0.25 PF, Ceramic
C24	ECK-E05223P	0.022 μ F, 50WV, +100%, Ceramic - 0%,
C28	ECK-E05103MY	0.01 μ F, 50WV, $\pm 20\%$, Ceramic
C29	ECK-E05103MY	0.01 μ F, 50WV, $\pm 20\%$, Ceramic
C30	ECC-D05050CC	5 PF, 50WV, ± 0.25 PF, Ceramic
C33	ECK-E05103P	0.01 μ F, 50WV, +100%, Ceramic - 0%,
C34	ECQ-S1271JZ	270PF, 125WV, $\pm 5\%$, Styrol
C35	ECK-E05223P	0.022 μ F, 50WV, +100%, Ceramic - 0%,
C36	ECE-A6V470	470 μ F, 6.3WV, Electrolytic
C37	ECC-D05040C	4 PF, 50WV, ± 0.25 PF, Ceramic
C38	ECK-E05103P	0.01 μ F, 50WV, +100%, Ceramic - 0%,
C39	ECQ-S1152KZ	1500 PF, 125WV, $\pm 10\%$, Styrol
C40	ECC-D05120KC	12 PF, 50WV, $\pm 10\%$, Ceramic
C41	ECC-D05150KC	15 PF, 50WV, $\pm 10\%$, Ceramic
C42	ECK-E05103P	0.01 μ F, 50WV, +100%, Ceramic - 0%,
C43	ECK-E05223P	0.022 μ F, 50WV, +100%, Ceramic - 0%,
C44	ECE-A16V3R3	3.3 μ F, 16WV, Electrolytic
C45	ECK-E05223P	0.022 μ F, 50WV, +100%, Ceramic - 0%,
C46	ECC-D05040C	4 PF, 50WV, ± 0.25 PF, Ceramic
C47	ECK-E05103P	0.01 μ F, 50WV, +100%, Ceramic - 0%,
C48	ECK-E05223P	0.022 μ F, 50WV, +100%, Ceramic - 0%,
C49	ECC-D05040C	4 PF, 50WV, ± 0.25 PF, Ceramic
C50	ECM-S05470K-H	47 PF, 50WV, $\pm 10\%$, Mica
C51	ECQ-S1271JZ	270PF, 125WV, $\pm 5\%$, Styrol
C52	ECE-A16V4R7	4.7 μ F, 16WV, Electrolytic
C53	ECQ-S1222KZ	2200 PF, 125WV, $\pm 10\%$, Styrol
C54	ECM-S05820K-H	82 PF, 50WV, $\pm 10\%$, Mica
C55	ECQ-G05153MZ-N	0.015 μ F, 50WV, $\pm 20\%$, Polyester
C56	ECQ-S1472KZ	4700 PF, 125WV, $\pm 10\%$, Styrol
C57	ECE-A16V4R7	4.7 μ F, 16WV, Electrolytic
C58	ECQ-G05103MZ-N	0.01 μ F, 50WV, $\pm 20\%$, Polyester
C59	ECQ-S1472KZ	4700 PF, 125WV, $\pm 10\%$, Styrol
C60	ECQ-G05223MZ-N	0.022 μ F, 50WV, $\pm 20\%$, Polyester
C61	ECE-A25V1	1 μ F, 25WV, Electrolytic
C62	ECQ-S1152KZ	1500 PF, 125WV, $\pm 10\%$, Styrol
C63	ECE-B16V2200	2200 μ F, 16WV, Electrolytic
C64	ECE-B16V2200	2200 μ F, 16WV, Electrolytic
C65	ECE-A16V47	47 μ F, 16WV, Electrolytic
C66	ECQ-G05223MZ-N	0.022 μ F, 50WV, $\pm 20\%$, Polyester
C67	ECQ-G05223MZ-N	0.022 μ F, 50WV, $\pm 20\%$, Polyester
C68	ECQ-G05103MZ-N	0.01 μ F, 50WV, $\pm 20\%$, Polyester
C69	ECQ-G05103MZ-N	0.01 μ F, 50WV, $\pm 20\%$, Polyester
C70	ECE-A16V4R7	4.7 μ F, 16WV, Electrolytic
C71	ECE-A16V4R7	4.7 μ F, 16WV, Electrolytic
C72	ECE-A16V3R3	3.3 μ F, 16WV, Electrolytic
C73	ECE-A16V4R7	4.7 μ F, 16WV, Electrolytic
C74	ECE-A16V3R3	3.3 μ F, 16WV, Electrolytic
C75	ECE-A16V3R3	3.3 μ F, 16WV, Electrolytic
C76	ECE-A16V3R3	3.3 μ F, 16WV, Electrolytic
C77	ECA-G16ER33	0.33 μ F, 16WV, Electrolytic
C78	ECA-G16ER33	0.33 μ F, 16WV, Electrolytic

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Ref. No.	Part No.	Description
CAPACITORS		
C79	ECE-A6V220	220 μ F, 6.3WV, Electrolytic
C80	ECQ-G05153MZ-N	0.015 μ F, 50WV, $\pm 20\%$, Polyester
C81	ECA-G16ER22	0.22 μ F, 16WV, Electrolytic
C82	ECQ-G05153MZ-N	0.015 μ F, 50WV, $\pm 20\%$, Polyester
C83	ECA-G16ER22	0.22 μ F, 16WV, Electrolytic
C84	ECA-G16ER33	0.33 μ F, 16WV, Electrolytic
C85	ECA-G16ER33	0.33 μ F, 16WV, Electrolytic
C86	ECA-G16ER1	0.1 μ F, 16WV, Electrolytic
C87	ECE-A10V100	100 μ F, 10WV, Electrolytic
C88	ECQ-G05222MZ-N	0.0022 μ F, 50WV, $\pm 20\%$, Polyester
C89	ECE-A10V47	47 μ F, 10WV, Electrolytic
C90	ECE-A6V220	220 μ F, 6.3WV, Electrolytic
C91	ECE-A6V220	220 μ F, 6.3WV, Electrolytic
C92	ECQ-G05222MZ-N	0.0022 μ F, 50WV, $\pm 20\%$, Polyester
C93	ECK-D14101P	100 PF, 2800WV, $\pm 100\%$, Ceramic
C94	ECE-A16V4R7	4.7 μ F, 16WV, Electrolytic
C95	ECE-A16V4R7	4.7 μ F, 16WV, Electrolytic
C96	ECC-D05330KC	33 PF, 50WV, $\pm 10\%$, Ceramic
C97	ECE-G16ER1	0.1 μ F, 16WV, Electrolytic
C98	ECE-A6V33	33 μ F, 6.3WV, Electrolytic
C99	ECE-A10V10	10 μ F, 10WV, Electrolytic
C100	ECC-D05010C	1 PF, 50WV, ± 0.25 PF, Ceramic
C101	ECQ-G05222MZ-N	0.0022 μ F, 50WV, $\pm 20\%$, Polyester
C102	ECQ-G05222MZ-N	0.0022 μ F, 50WV, $\pm 20\%$, Polyester
C103	ECQ-G05222MZ-N	0.0022 μ F, 50WV, $\pm 20\%$, Polyester
C104	ECQ-G05222MZ-N	0.0022 μ F, 50WV, $\pm 20\%$, Polyester
C105	ECK-E05103MY	0.01 μ F, 50WV, $\pm 20\%$, Ceramic
C106	ECK-E05103MY	0.01 μ F, 50WV, $\pm 20\%$, Ceramic
C107	ECK-E05103MY	0.01 μ F, 50WV, $\pm 20\%$, Ceramic
RESISTORS		
R1	ERD-14VK 474	470K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R2	ERD-14VK 224	220K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R3	ERD-14VK 182	1.8K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R4	ERD-14VK 682	6.8K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R5	ERD-14VK 471	470 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R6	ERD-14VK 102	1K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R7	ERD-14VK 472	4.7K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R8	ERD-14VK 123	12K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R9	ERD-14VK 272	2.7K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R10	ERD-14VK 561	560 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R11	ERD-14VK 104	100K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R12	ERD-14VK 221	220 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R13	ERD-14VK 101	100 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R14	ERD-14VK 224	220K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R15	ERD-14VK 474	470K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R16	ERD-14VK 121	120 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R17	ERD-14VK 153	15K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R18	ERD-14VK 333	33K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R19	ERD-14VK 222	2.2K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R20	ERD-14VK 221	220 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R21	ERD-14VK 562	5.6K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R22	ERD-14VK 183	18K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R23	ERD-14VK 182	1.8K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R24	ERD-14VK 681	680 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R25	ERD-14VK 391	390 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R26	ERD-14VK 101	100 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R27	ERD-14VK 124	120K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R28	ERD-14TK 331	330 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R29	ERD-14VK 221	220 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R30	ERD-14TK 101	100 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R31	ERD-14VK 153	15K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R32	ERD-14TK 562	5.6K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R33	ERD-14TK 681	680 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R34	ERD-14TK 221	220 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R35	ERD-14VK 102	1K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon

Ref. No.	Part No.	Description
RESISTORS		
R36	ERD-14VK 102	1K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R37	ERD-14VK 472	4.7K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R38	ERD-14VK 273	27K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R39	ERD-14VK 222	2.2K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R40	ERD-14VK 224	220K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R41	EVL-SOAA00B13	1K Ω (B), Separation Control
R42	ERD-14TK 152	1.5K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R43	ERD-14VK 334	330K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R44	ERD-14VK 101	100 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R45	ERD-14VK 820	82 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R46	ERD-14VK 103	10K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R47	ERD-14VK 473	47K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R48	ERD-14VK 222	2.2K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R49	ERD-14VK 222	2.2K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R50	ERD-14TK 102	1K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R51	ERD-14VK 562	5.6K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R52	ERD-14VK 101	100 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R53	ERC-12GM 681	680 Ω , $\frac{1}{2}$ Watt, $\pm 20\%$, Solid
R54	ERC-12GM 680	68 Ω , $\frac{1}{2}$ Watt, $\pm 20\%$, Solid
R55	ERD-14TK 222	2.2K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R56	ERD-14VK 102	1K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R57	ERD-14VK 102	1K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R58	ERD-14VK 102	1K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R59	ERD-14VK 102	1K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R60	ERD-14VK 222	2.2K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R61	ERD-14VK 223	22K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R62	ERD-14VK 223	22K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R63	ERC-12GM 155	1.5M Ω , $\frac{1}{2}$ Watt, $\pm 20\%$, Solid
R64	ERC-12GM 155	1.5M Ω , $\frac{1}{2}$ Watt, $\pm 20\%$, Solid
R65	ERC-12GM 225	2.2M Ω , $\frac{1}{2}$ Watt, $\pm 20\%$, Solid
R66	ERC-12GM 225	2.2M Ω , $\frac{1}{2}$ Watt, $\pm 20\%$, Solid
R67	ERD-14VK 183	18K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R68	ERD-14VK 183	18K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R69	ERD-14VK 562	5.6K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R70	ERD-14VK 562	5.6K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R71	ERD-14VK 102	1K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R72	ERD-14VK 332	3.3K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R73	ERD-14VK 332	3.3K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R74	ERD-14VK 823	82K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R75	ERD-14VK 823	82K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R76	ERD-14VK 101	100 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R77	ERD-14VK 101	100 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R78	ERD-14VK 222	2.2K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R79	ERD-14VK 222	2.2K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R80	ERD-14VK 222	2.2K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R81	ERD-14VK 121	120 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R82	ERD-14VK 222	2.2K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R83	ERD-14VK 472	4.7K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R84	ERD-14VK 472	4.7K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R85	EVC-S2AL50G14	10K Ω (G), Balance Control
R86, R87	EVF-77NL50A14	10K Ω (A), Volume Control, w/ON-OFF Switch (S1-1~S1-2)
R88	ERD-14VK 222	2.2K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R89	ERD-14VK 222	2.2K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R90, R91	EVF-68AL50A14	10K Ω (A), Treble Control
R92	ERD-14VK 102	1K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R93	ERD-14VK 102	1K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R94	ERD-14VK 272	2.7K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R95, R99	EVF-68AL50A14	10K Ω (A), Bass Control
R96	ERD-14VK 391	390 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R97	ERD-14VK 332	3.3K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R98	ERD-14VK 272	2.7K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R100	ERD-14VK 391	390 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R101	ERD-14VK 101	100 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R102	ERD-14VK 122	1.2K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R103	ERD-14VK 222	2.2K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R104	EVL-TOAA00B53	5K Ω (B), Line Voltage Control
R105	ERD-14VK 123	12K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon

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Ref. No.	Part No.	Description
RESISTORS		
R106	ERD-14VK 101	100 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R107	ERD-14VK 274	270K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R108	ERD-14VK 332	3.3K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R109	ERD-14VK 123	12K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R110	ERD-14VK 331	330 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R112	ERD-14VK 151	150 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R113	ERD-14VK 472	4.7K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R114	ERD-14VK 151	150 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R115	ERD-14VK 474	470K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R116	ERD-14VK 102	1K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R117	ERD-14VK 180	18 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R118	ERD-14VK 102	1K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R119	ERD-14VK 180	18 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R120	ERD-14VK 102	1K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R121	ERD-14VK 180	18 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R122	ERD-14VK 102	1K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R123	ERD-14VK 180	18 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R124	ERD-14VK 274	270K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R125	ERD-14VK 1R5	1.5 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R126	ERD-14VK 1R5	1.5 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R127	ERD-14VK 1R5	1.5 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R128	ERD-14VK 1R5	1.5 Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R129	ERD-14VK 474	470K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R131	ERD-14VK 152	1.5K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R132	ERD-14VK 822	8.2K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R133	ERD-14VK 152	1.5K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R134	ERD-14TK 153	15K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R135	ERD-14VK 103	10K Ω , $\frac{1}{4}$ Watt, $\pm 10\%$, Carbon
R136	ERC-12GM 331	330 Ω , $\frac{1}{2}$ Watt, $\pm 20\%$, Solid
R137	ERC-12GM 331	330 Ω , $\frac{1}{2}$ Watt, $\pm 20\%$, Solid
COMPONENT COMBINATION		
M1	EXA-F203Z471	0.01 μ F, 0.01 μ F, & 470 Ω
M2	EXA-5DL04C	330PF, 330PF, 4.7K Ω & 4.7K Ω
COILS AND TRANSFORMERS		
L1	RLA-4P7	FM Antenna Coil
L2	RLD-4Y54	FM Collector Coil
L3	RLQ-Y21G-1	FM Choke Coil
L4	RLQ-4Y53	FM Oscillator Coil
L5	RLF-2D48	AM Antenna Coil
L6	RLO-2B50	AM Oscillator Coil
L7	RLQ-X121-1	Choke Coil
L8	RLQ-1X3-Y	SCA Trap Coil
T1	RLI-4B152-M	FM 1st IF Transformer, Primary
T2	RLI-4B152-M	FM 1st IF Transformer, Secondary
T3	RLI-4B351-M	FM 2nd IF Transformer, Primary
T4	RLI-2B152-M	AM 1st IF Transformer, Primary
T5	RLI-4B351-M	FM 2nd IF Transformer, Secondary
T6	RLI-2B157-M	AM 1st IF Transformer, Secondary
T7	RLI-4B251-M	FM 3rd IF Transformer
T8	RLI-2B257-M	AM 2nd IF Transformer
T9	RLI-4B551	FM 4th IF Transformer, Primary
T10	RLI-4B552	FM 4th IF Transformer, Secondary
T11	RLI-2B457-M	AM 3rd IF Transformer
T12	RLM-1C4-T	MPX Coil
T13	RLM-1C2-T	MPX Coil
T14	RLM-1C7	MPX Coil
T15	RLT-3G21	Input Transformer (Right) P=1.5K Ω :S=200 Ω
T16	RLT-3G21	Input Transformer (Left) P=1.5K Ω :S=200 Ω
T17	RLT-5L36	Power Transformer
SWITCHES		
S2	ESR-E134L50AE	Band Selector Switch
S3	RSR-22	AFC Switch
S4	RSR-29	Power Source Voltage Selector Switch

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Ref. No.	Part No.	Description
MISCELLANEOUS		
	RJS-31	Socket, Record/playback
	RSF-1022	Fuse (2 req'd)
	RJF-114	Holder, Fuse
	RVL-212-4	Dial Light, 7.5V 0.075A
	RVL-218	Dial Light, 6.3V 0.25A (5 req'd)
	RJF-113	Holder, Dial Light (5 req'd)
	RJA-39	AC Cord, Power Source
	RHR-111	Grommet, AC Cord
	RJF-4209-1	Terminal, FM EXT Antenna
	RJF-3602	Jack, Phono, Tape & Speaker
	RJJ-79	Jack, Headphone
	RMV-75	Heat Sink, Transistor (TR ₁₂)
	RMV-6	Heat Sink, Transistor (TR ₂₅)
	RDT-5496	Shaft, Tuning
	RDD-33-2	Drum, Dial
	M2-5	Screw, Dial Drum M'tg.
	RDX-801-1S	Shaft, Dial Drum (150)
	RDG-7-1	Gear (thick), Dial
	RDG-605-1	Gear (thin), Dial
	M2.6-8	Screw, Gear M'tg.
	RUS-80	Spring, Gear
	RDZ-07-1	Cord, Dial, 140cm (55 1/8").
	RDS-417	Spring, Dial (2 req'd)
	RHG-5-1	Rubber Cushion, Tuning Gang M'tg. (4 req'd)
	RHG-109	Rubber Cushion, Core Antenna M'tg. (2 req'd)
	M4-16RS	Red Screw, Cabinet M'tg. (4 req'd) (150)
	XYNR3D6RS	Red Screw, Chassis M'tg. (3 req'd) (150)
	M4-20RS	Red Screw, Chassis M'tg. (4 req'd) (150)
	RNT-520	Washer, Chassis M'tg. (4 req'd)
APPEARANCE		
	RYA-4750S	Cabinet (complete) (150)
	RYE-241	Scale (complete), Dial
	RKU-3160	Rear Panel, Cabinet
	⊕MM2.7-13	Screw, Rear Panel M'tg. (3 req'd)
	*RGP-3040	Panel, Dial
	*RNE-914	Lock Washer, Dial Panel M'tg. (5 req'd)
	RBN-280	Knob; AFC, Treble, Bass, Balance & Volume
	RBN-281	Knob, Tuning & Band Selector
	RDP-329	Pointer, Dial

SPEAKER SYSTEM

Ref. No.	Part No.	Description
SPEAKERS		
SP ₁ & SP ₂	EAS-16P91SA	16 cm (6 1/2") PM Dynamic Speaker, Imp. 16Ω
APPEARANCE AND MISCELLANEOUS		
	RKM-1682	Speaker Cabinet (2 req'd)
	RYU-330	Rear Panel (complete) (2 req'd)
	RKB-9037-2S	Baffle board (2 req'd) (150)
	RJP-9034	Cord, Speaker (2 req'd)
	⊕MM2.7-13	Screw, Rear Panel M'tg. (6 req'd)

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